chromosomes. This may be a rather general situation among the simpler plants, where germ plasm and body plasm are merged. Whether it is at all applicable to higher plants is questionable. Perhaps the "phylogenetic age" of the latter has brought this difference of body plasm and germ plasm, involving a rigid chromosome mechanism. The other picture is "that the swarming period . . . . is not one of aimless movement . . . . but a definitely directed effort to achieve for each cell a specific relation to its fellows." Successful achievement means normal colonies; otherwise monstrosities result. This situation could apply only to a very limited number of cases, even among the lower plants. Among higher plants a vivid imagination might attempt to apply it to the free nuclear stage in the embryo formation of gymnosperms, or in the organization of the embryo sac of angiosperms. The author, however, does not carry his ideas beyond *Pediastrum*, where they seem quite appropriate and well founded. Similarly careful work upon less peculiar types of algae should yield even more profitable suggestions.—MERLE C. COULTER.

Mendelian inheritance in gametophytes.—One of the most critical tests of the current theoretical mechanism for inheritance lies in the behavior of the gametophyte generation in inheritance. If our Mendelian mechanism is correct, gametophytes should show predictable peculiarities; segregation should take place in the first hybrid generation, and dominance should be out of the question. Such an investigation is not particularly hopeful among angiosperms, owing to the insignificance of the gametophytes. In fact it is a rather general opinion that "the characters which they possess appear to be wholly sporophytic, the factors which they carry functioning only after fertilization."[3] BELLING[4] explains semi-sterility in beans on the basis of the germinal equipment of the gametophytes upon the gametophytes themselves, but this merely involves lethal effects.

More hopeful material is provided by the lower plants, where the gametophyte generation is more prominent and really has characters of its own. TRANSEAU[5] reports hybridization in *Spirogyra*, and it is significant that he can give it a Mendelian interpretation. Unfortunately the work is as yet merely observational rather than experimental. Hybridization was observed taking place in nature between *S. communis* and *S. varians*, *S. varians* and *S. porticalis*. The 3 species involved showed distinguishing characters in the shape and size of the vegetative cells, and the shape and orientation of the zygotes. The auther looked in the immediate vicinity, therefore, for possible hybrids resulting from these crosses which should display new combinations of the parental

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[3] EAST, E. M., and PARK, J. B., Studies on self-sterility. I. The behavior of self-sterile plants. Genetics 2:525–609. 1917.

[4] BELLING, JOHN, Lethal factors and sterility. Jour. Heredity 9:161–165. 1918.

[5] TRANSEAU, EDGAR NELSON, Hybrids among species of *Spirogyra*. Amer. Nat. 53:109–119. *figs*. 7. 1919.

characters. He was successful in finding practically all the new combinations that were theoretically possible.

The Mendelian explanation runs as follows: The character of the hybrid zygote itself is maternal, as is to be expected from the cytological behavior during conjugation. The reduction division takes place during the first 2 nuclear divisions of the germinating zygote, but 3 of the resulting nuclei degenerate, so that the cells of the mature filament all have a common ancestor in the fourth nucleus; hence segregation appears in the first hybrid generation, but of course all of the cells of a given filament are alike. Such facts would furnish excellent support for our theoretical mechanism of inheritance, but the author could not be positive as to whether he was dealing with an F_1 or an F_2 generation. It is to be hoped that he will discover how to cultivate this material in the laboratory, and carry the work further under rigid experimental control.—MERLE C. COULTER.

Enzyme action.—VAN LAER[6] reports some observations on the nature of zymogens, which are claimed to confirm the results of FORD and GUTHRIE, who had shown that the increase of the amyloclastic activity of papaine with barley meal is not manifested when the infusion is kept in direct contact with the proteo-clastic ferments. The yeast infusions were obtained from yeast prepared according to the Lebedeff method. The addition of papaine to yeast juice destroyed the catalase and zymase. In the state of zymogens, there was shown greater stability and resistance to the factors of inactivation. The hefanal extract of yeast in the presence of antiseptics showed a measurable degree of inverting activity. This inverting agent was amylase. The diastase and papaine had no influence upon the hefanel infusion even after a 24 hours' digestion. Observation is made upon the intensity of autofermentation. After the latter there remains some amylase which is sensitive to papaine. This sensitiveness is expressed in the data as the decrease of the percentage of sugar inverted from 25.6 to 19 when papaine was added. Certain cellulary materials, as soluble or incoagulable protoplasmic products, decreased the activity of sucrase according to the concentration. In the presence of small quantities of these substances the rapidity of hydrolysis of saccharose is hardly modified. Extracts of yeast inactivated by acetone give a notable increase of inverting power when added to solution of papaine or active anylase, the yeast cells in this respect behaving like cellulary bodies. This increase is due on the one hand to the increase of sucrase, and on the other to the decrease of cellulary substance in the digestion products.—A. M. GURJAR.

Buried weed seeds.—Miss BRENCHLEY,[7] on the basis of considerable investigation, makes the following statement concerning the longevity of weed seeds in agricultural soils: "The changes in the proportion of arable and

[6] VAN LAER, HENRI, Zeits. für Gärungsphysiologie 6:169–175. 1918.

[7] BRENCHLEY, WINIFRED E., Buried weed seeds. Jour. Agric. Sci. 9:1–31. 1918.